

NEW!

EMUGE



**SOLID CARBIDE END MILLS
FOR TROCHOIDAL MILLING**

INTRODUCING

EMUGE *Trochoidal End Mills*



High Performance Trochoidal Milling

Emuge continues to develop industry-leading solutions for today's latest milling applications via the introduction of an **advanced line of end mills featuring unique geometry and chip breakers designed specifically for trochoidal milling**. Rely on these all-new Emuge Trochoidal tools to guarantee you the **highest possible performance in trochoidal milling**.

100 years of precision milling and innovation.

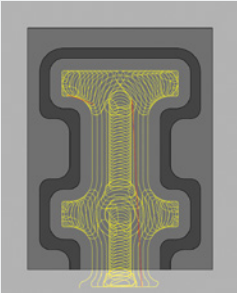
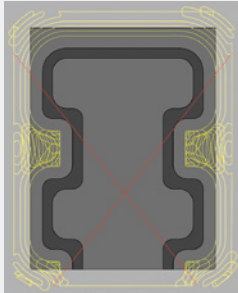




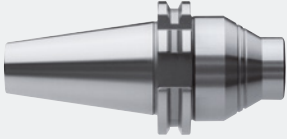
Ever since its foundation, Franken, as part of the Emuge-Franken Company, has been developing and manufacturing milling tools — a wide range of solid carbide and HSS end mills, PCD and CBN inserts and milling cutters with indexable inserts, characterized by precision and innovation.

The Franken production facility is located in Rückersdorf, Germany and is dedicated to the manufacturing of high precision end mills and indexable cutters as well as special design form and profile milling tools. With an extensive variety of tool types in a wide range of materials, Emuge-Franken manufactures only the highest quality cutting tools for discerning customers.



Emuge-Franken, Rückersdorf, Germany

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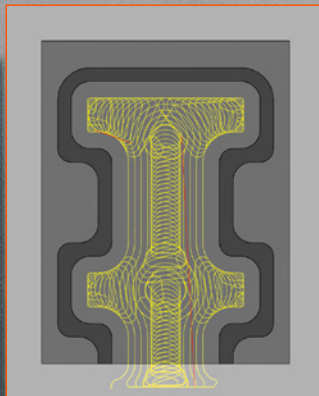
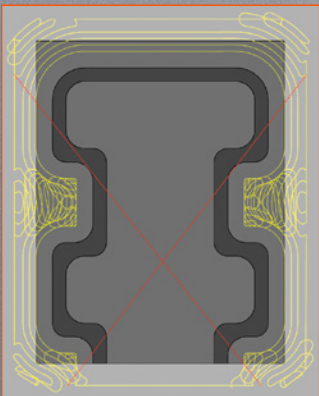
Trochoidal Milling

Trochoidal milling is the overlapping of a circular path with a linear movement and thus the conversion of slot milling into contour milling. Just as in finishing operations, the chip is peeled from the workpiece with a low radial depth of cut and a maximum axial depth of cut ($2 \times D$ to $4 \times D$). **The small contact angle reduces heat generation during machining and less thermal stress provides increased material removal and longer tool life.**

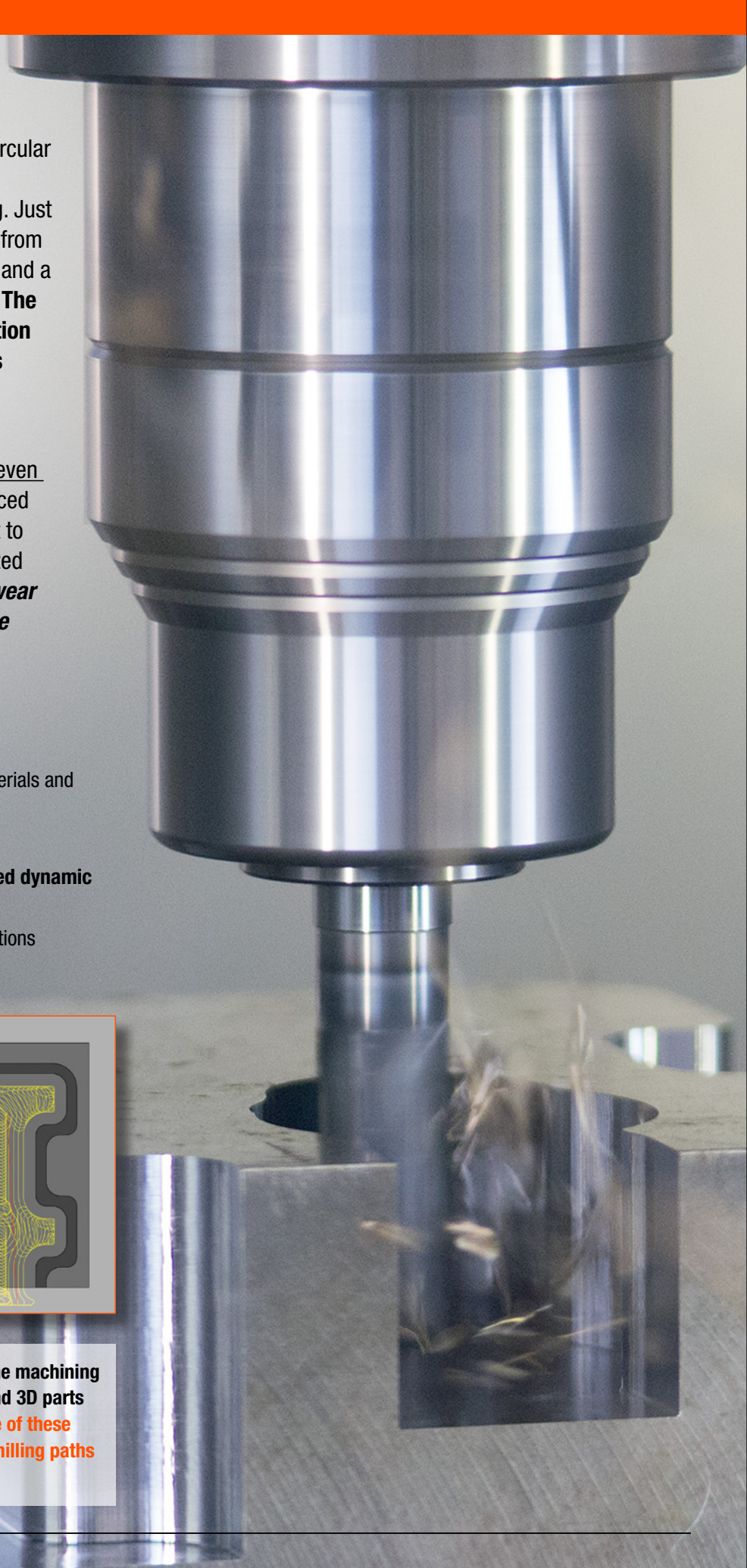
High metal removal rates can be generated even on low-powered machines and wear is reduced during full slot milling, particularly in difficult to machine materials. Plus, the end mill is utilized over the entire flute length, and as a result **wear is evenly spaced over the full cutting edge length, increasing tool life.**

Advantages of Emuge Trochoidal Milling

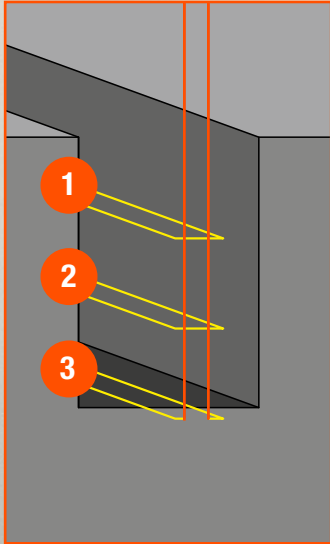
- Particularly suitable for difficult to machine materials and thin-walled components
- **Reduced stress** on tools and machine
- **Increased metal removal rate on low-powered dynamic machines**
- Suitable for unstable workpiece clamping conditions
- Enables **high axial depth** of cut up to $4 \times D$



New CAD/CAM programming systems enable the machining of complex contours and deep pockets in 2D and 3D parts with a trochoidal milling strategy. **The objective of these new strategies is the optimized calculation of milling paths to avoid unproductive tool motion.**



Slot Milling Strategy Comparisons

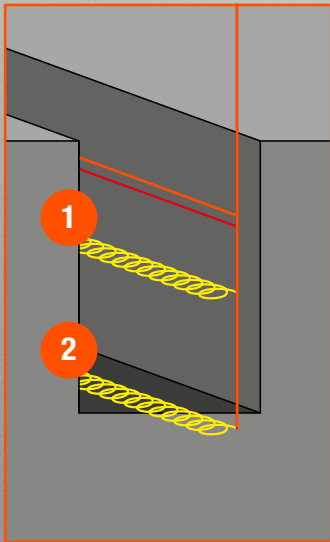


HPC Slot Milling with Standard solid carbide end mill

Slot L x W x H:	18" x 3/4" x 1-3/4"
Material:	4140 Steel
Tool:	2994L.0625
Diameter:	5/8"
Cutting length:	1-1/4"
Flutes:	4
Cutting speed (V _c):	490 SFM
Feed per tooth (f _z):	.003"
Axial depth of cut (a _p):	.60"
Radial depth of cut (a _e):	5/8"

Machining time: 3:13 Minutes

**Milling strategy requires
3 tool paths**

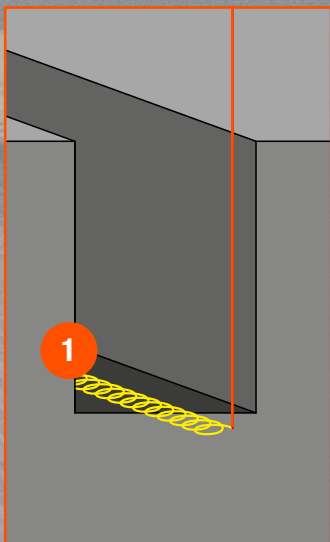


Trochoidal Slot Milling with Standard solid carbide end mill

Slot L x W x H:	18" x 3/4" x 1-3/4"
Material:	4140 Steel
Tool:	2994L.0625
Diameter:	5/8"
Cutting length:	1-1/4"
Flutes:	4
Cutting speed (V _c):	655 SFM
Feed per tooth (f _z):	.005"
Axial depth of cut (a _p):	7/8"
Radial depth of cut (a _e):	.090"

Machining time: 2:57 Minutes

**Milling strategy requires
2 tool paths**



Trochoidal Slot Milling with Emuge Trochoidal solid carbide end mill

Slot L x W x H:	18" x 3/4" x 1-3/4"
Material:	4140 Steel
Tool:	2573L.0625
Diameter:	5/8"
Flutes:	5
Cutting speed (V _c):	655 SFM
Feed per tooth (f _z):	.005"
Axial depth of cut (a _p):	1-3/4"
Radial depth of cut (a _e):	.050"

Machining time: 2:07 Minutes

EMUGE
**Milling strategy requires only
1 tool path**

Choose the end mills most suitable for your applications / materials:

	P	M	K	N	S	H
Tool Type	High Performance End Mill Program					
NR						
NF	Jet-Cut TiNox-Cut	TiNox-Cut Jet-Cut	Jet-Cut TiNox-Cut	TiNox-Cut Jet-Cut	TiNox-Cut Jet-Cut	
N						
H						

Applications – Materials		Hardness Range			Material Examples
		HRC	BHN	N/mm ²	
P	Steel materials				
	1.1 Cold-extrusion steels, Construction steels, Free-cutting steels, etc.		≤ 180	≤ 600	1010 / 1018 / 1020 / 12L14 / 12L15 / A36 / T1
	2.1 Construction steels, Cementation steels, Steel castings, etc.	≤ 22	≤ 235	≤ 800	A36 / T1 / 1030-1095 / 4140 / 4340 / 8620
	3.1 Cementation steels, Heat-treatable steels, Cold work steels, etc.	≤ 31	≤ 295	≤ 1000	4140 / 4340 / 8620 / P20 / H13 / D2 / A2 / S7 / H1150
	4.1 Heat-treatable steels, Cold work steels, Nitriding steels, etc.	≤ 38	≤ 355	≤ 1200	4140 / 4340 / 8620 / P20 / H13 / D2 / 300M / 52100 / M1-M42
5.1 High-alloyed steels, Cold work steels, Hot work steels, etc.	≤ 44	≤ 415	≤ 1400	4140 / 4340 / 8620 / P20 / H13 / D2 / 300M / 52100	
M	Stainless steel materials				
	1.1 Ferritic, martensitic	≤ 29	≤ 280	≤ 950	410 / 440 / 440C / 17-4 PH
	2.1 Austenitic	≤ 29	≤ 280	≤ 950	303 / 304 / 316 / 316L / 321
	3.1 Austenitic-ferritic (Duplex)	≤ 35	≤ 325	≤ 1100	
	4.1 Austenitic-ferritic heat-resistant (Super Duplex)	≤ 39	≤ 370	≤ 1250	
K	Cast materials				
	1.1 Cast iron with lamellar graphite (GJL)		30 - 75	100 - 250	Grey cast irons G10-GG40
	1.2		75 - 135	250 - 450	
	2.1 Cast iron with nodular graphite (GJS)		105 - 150	350 - 500	Nodular GGG40-GGG70
	2.2		150 - 265	500 - 900	
	3.1 Cast iron with vermicular graphite (GJV)		90 - 120	300 - 400	
	3.2		120 - 150	400 - 500	Compact graphite iron (CGI)
4.1 Malleable cast iron (GTMW, GTMB)		70 - 145	250 - 500		
4.2		150 - 235	500 - 800	White iron	
N	Non ferrous materials				
	Aluminium alloys				
	1.1		≤ 60	≤ 200	7075
	1.2 Aluminium wrought alloys		≤ 105	≤ 350	6061-T6 / 2024-T4
	1.3		≤ 165	≤ 550	
	1.4 Aluminium cast alloys Si ≤ 7%				
	1.5 Aluminium cast alloys 7% < Si ≤ 12%				
	1.6 Aluminium cast alloys 12% < Si ≤ 17%				
	Copper alloys				
	2.1 Pure copper, low-alloyed copper		≤ 120	≤ 400	
	2.2 Copper-zinc alloys (brass, long-chipping)		≤ 165	≤ 550	
	2.3 Copper-zinc alloys (brass, short-chipping)		≤ 165	≤ 550	
	2.4 Copper-aluminium alloys (alu bronze, long-chipping)		≤ 235	≤ 800	
	2.5 Copper-tin alloys (tin bronze, long-chipping)		≤ 205	≤ 700	
	2.6 Copper-tin alloys (tin bronze, short-chipping)		≤ 120	≤ 400	
	2.7		≤ 180	≤ 600	
	2.8 Special copper alloys	≤ 44	≤ 415	≤ 1400	
	Magnesium alloys				
	3.1 Magnesium wrought alloys		≤ 150	≤ 500	
	3.2 Magnesium cast alloys		≤ 150	≤ 500	
	Synthetics				
	4.1 Duroplastics (short-chipping)				
4.2 Thermoplastics (long-chipping)					
4.3 Fibre-reinforced synthetics (fibre content ≤ 30%)					
4.4 Fibre-reinforced synthetics (fibre content > 30%)					
Special materials					
5.1 Graphite					
5.2 Tungsten-copper alloys					
5.3 Composite materials					
S	Special materials				
	Titanium alloys				
	1.1 Pure titanium		≤ 135	≤ 450	CP1 / CP2
	1.2 Titanium alloys	≤ 27	≤ 265	≤ 900	6AL4V
	1.3	≤ 39	≤ 370	≤ 1250	
	Nickel alloys, cobalt alloys and iron alloys				
	2.1 Pure nickel		≤ 180	≤ 600	
	2.2	≤ 31	≤ 295	≤ 1000	Monel 500 / Hastelloy / 625 Inconel
	2.3 Nickel-base alloys	≤ 49	≤ 475	≤ 1600	718 Inconel
	2.4 Cobalt-base alloys	≤ 31	≤ 295	≤ 1000	
	2.5	≤ 49	≤ 475	≤ 1600	Haynes 25
2.6 Iron-base alloys	≤ 46	≤ 445	≤ 1500	Incoloy 925	
H	Hard materials				
	1.1		44 - 50		Weldox 1100
	1.2		50 - 55		Hardox 550
	1.3 High strength steels, hardened steels, hard castings		55 - 60		ArmoX 600T
	1.4		60 - 63		Ferro-Titanit
	1.5		63 - 66		HSSE



Stainless Steel, Inconel, Titanium, Non-Ferrous

Full Range of Steels

NF medium

2577TZ 2537TZ	2579TZ 2539TZ	2581TZ 2541TZ	2571L 2531L	2573L 2533L	2575L 2535L	Page
8	8	8	10	10	10	
9	9	9	11	11	11	v_c / f_z
■	■	■	■	■	■	1.1
■	■	■	■	■	■	2.1
■	■	■	■	■	■	3.1
□	□	□	■	■	■	4.1
□	□	□	■	■	■	5.1
■	■	■	■	■	■	1.1
■	■	■	■	■	■	2.1
■	■	■	□	□	□	3.1
■	■	■	□	□	□	4.1
□	□	□	■	■	■	1.1
□	□	□	■	■	■	1.2
□	□	□	■	■	■	2.1
□	□	□	■	■	■	2.2
□	□	□	■	■	■	3.1
□	□	□	■	■	■	3.2
□	□	□	■	■	■	4.1
□	□	□	■	■	■	4.2
■	■	■	□	□	□	1.1
■	■	■	□	□	□	1.2
■	■	■	□	□	□	1.3
						1.4
						1.5
						1.6
■	■	■	□	□	□	2.1
■	■	■	□	□	□	2.2
■	■	■	□	□	□	2.3
■	■	■	□	□	□	2.4
■	■	■	□	□	□	2.5
■	■	■	□	□	□	2.6
■	■	■	□	□	□	2.7
■	■	■	□	□	□	2.8
						3.1
						3.2
						4.1
						4.2
						4.3
						4.4
■	■	■	□	□	□	5.1
						5.2
						5.3
■	■	■	■	■	■	1.1
■	■	■	■	■	■	1.2
■	■	■	■	■	■	1.3
■	■	■	□	□	□	2.1
■	■	■	□	□	□	2.2
■	■	■	□	□	□	2.3
■	■	■	□	□	□	2.4
■	■	■	□	□	□	2.5
■	■	■	□	□	□	2.6
						1.1
						1.2
						1.3
						1.4
						1.5

■ = very suitable v_c = Cutting speed
 □ = suitable f_z = Feed per tooth

TiNox-Cut™ High Performance Roughing End Mills for Aerospace machining and other demanding trochoidal applications.

TiNox-Cut Trochoidal End Mills are for process-reliable roughing operations of materials such as Inconel, titanium and stainless steel and are guaranteed to deliver unmatched metal removal rates and tool life.

- Tool geometry designed for demanding materials such as stainless steel, Inconel, titanium
- **Unique chip breaker geometry** optimizes entire tool cutting length and provides even wear for aggressive, process-reliable roughing of pockets and contours
- Variable helix angle / spacing and special edge prep enables **low-vibration machining**
- **New high performance TiN/TiAlN coating** and micro-grain carbide substrate for exceptional wear resistance
- Coolant-thru design
- 3 available lengths: 2 x D, 3 x D, 4 x D

*German engineered
Emuge quality*

- High performance tool for trochoidal milling
- Newly developed geometry with chip breaker
- Low-vibration machining
- Axial depths of cut up to 4 x D
- Axial internal coolant supply (ICA)
- 3 lengths available

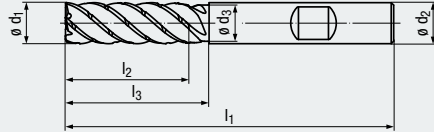
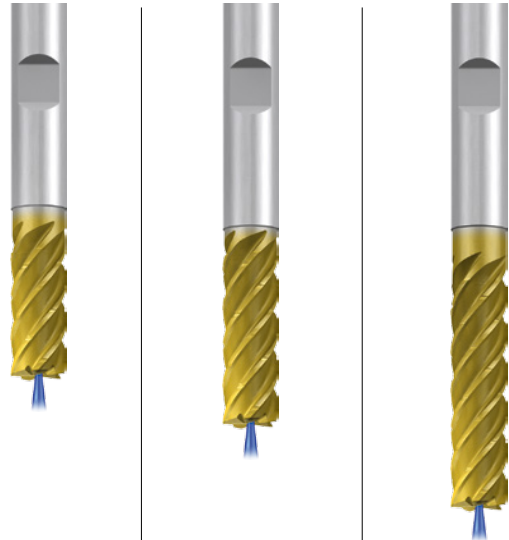
NF medium

ICA CH x 45°

Carbide

DIN 6535
HA
HB

38-42°



Coating

Applications / Materials (see page 6)

- For process-reliable trochoidal roughing operations
- Suitable for finishing
- Especially suitable for difficult-to-cut materials

TiN/TiAlN

P	1.1-3.1	4.1-5.1	P	1.1-3.1	4.1-5.1	P	1.1-3.1	4.1-5.1
M	1.1-4.1		M	1.1-4.1		M	1.1-4.1	
K		1.1-4.2	K		1.1-4.2	K		1.1-4.2
N	1.1-1.3		N	1.1-1.3		N	1.1-1.3	
N	2.1-2.8, 5.2		N	2.1-2.8, 5.2		N	2.1-2.8, 5.2	
S	1.1-2.6		S	1.1-2.6		S	1.1-2.6	

2 x D – Standard length

	$\varnothing d_1$ h10	l_2	l_3	l_1	$\varnothing d_3$	$\varnothing d_2$ h6	Chamfer	Flutes	Tool no.
[inch]	1/4	1/2		2 1/4	1/4	1/4	.005	4	2577TZ.0250
	5/16	13/16		2 1/2	5/16	5/16	.005	5	2577TZ.03125
	3/8	7/8		3	3/8	3/8	.008	5	2577TZ.0375
	1/2	1		3 1/4	1/2	1/2	.008	5	2577TZ.0500
	5/8	1 1/4		3 3/4	5/8	5/8	.008	5	2577TZ.0625
	3/4	1 1/2		4 1/4	3/4	3/4	.012	5	2577TZ.0750
[mm]	6	13	20	57	5.8	6	0.12	4	2537TZ.006
	8	19	25	63	7.7	8	0.12	5	2537TZ.008
	10	22	30	72	9.5	10	0.2	5	2537TZ.010
	12	26	35	83	11.5	12	0.2	5	2537TZ.012
	16	32	40	92	15.5	16	0.2	5	2537TZ.016
	20	40	50	104	19.5	20	0.3	5	2537TZ.020

3 x D – Long length

	$\varnothing d_1$ h10	l_2	l_3	l_1	$\varnothing d_3$	$\varnothing d_2$ h6	Chamfer	Flutes	Tool no.
[inch]	1/4	3/4		2 1/2	1/4	1/4	.005	4	2579TZ.0250
	5/16	1		2 3/4	5/16	5/16	.005	5	2579TZ.03125
	3/8	1 1/8		3 1/4	3/8	3/8	.008	5	2579TZ.0375
	1/2	1 1/2		3 3/4	1/2	1/2	.008	5	2579TZ.0500
	5/8	1 7/8		4 1/4	5/8	5/8	.008	5	2579TZ.0625
	3/4	2 1/4		5	3/4	3/4	.012	5	2579TZ.0750
[mm]	6	18	25	62	5.8	6	0.12	4	2539TZ.006
	8	24	30	68	7.7	8	0.12	5	2539TZ.008
	10	30	35	80	9.5	10	0.2	5	2539TZ.010
	12	36	45	93	11.5	12	0.2	5	2539TZ.012
	16	48	55	108	15.5	16	0.2	5	2539TZ.016
	20	60	70	126	19.5	20	0.3	5	2539TZ.020

4 x D – Long length

	$\varnothing d_1$ h10	l_2	l_3	l_1	$\varnothing d_3$	$\varnothing d_2$ h6	Chamfer	Flutes	Tool no.
[inch]	1/4	1		2 3/4	1/4	1/4	.005	4	2581TZ.0250
	5/16	1 1/4		3	5/16	5/16	.005	5	2581TZ.03125
	3/8	1 1/2		3 3/4	3/8	3/8	.008	5	2581TZ.0375
	1/2	2		4 1/4	1/2	1/2	.008	5	2581TZ.0500
	5/8	2 1/2		5	5/8	5/8	.008	5	2581TZ.0625
	3/4	3		6	3/4	3/4	.012	5	2581TZ.0750
[mm]	6	24	30	68	5.8	6	0.12	4	2541TZ.006
	8	32	40	80	7.7	8	0.12	5	2541TZ.008
	10	40	50	95	9.5	10	0.2	5	2541TZ.010
	12	48	60	107	11.5	12	0.2	5	2541TZ.012
	16	64	75	128	15.5	16	0.2	5	2541TZ.016
	20	80	90	150	19.5	20	0.3	5	2541TZ.020

Emuge Jet-Cut™ End Mills for universal trochoidal milling applications.

Jet-Cut Trochoidal End Mills are highly versatile, designed for a broad range of steels in both roughing and finishing operations.

- Tool geometry designed for a wide range of steels and operations
- **Unique chip breaker geometry** optimizes entire tool cutting length and provides even wear for aggressive, process-reliable roughing of pockets and contours
- Variable helix angle / spacing and special edge prep enables **low-vibration machining**
- **New high performance ALCR coating** and micro-grain carbide substrate for exceptional wear resistance
- 3 available lengths: 2 x D, 3 x D, 4 x D

*German engineered
Emuge quality*

- High performance tool for trochoidal milling
- Newly developed geometry with chip breaker
- Low-vibration machining
- Axial depths of cut up to 4 x D
- 3 lengths available

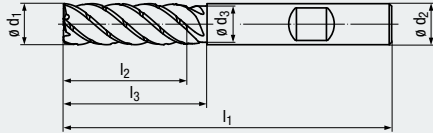
NF medium

Carbide

DIN 6535
HA
HB

CH x 45°

38-42°



Coating

Applications / Materials (see page 6)

- For process-reliable trochoidal roughing operations
- Suitable for finishing
- For all steel materials and cast materials

ALCR

P 1.1-5.1	P 1.1-5.1	P 1.1-5.1
M 1.1-2.1 3.1-4.1	M 1.1-2.1 3.1-4.1	M 1.1-2.1 3.1-4.1
K 1.1-4.2	K 1.1-4.2	K 1.1-4.2
N 1.1-1.3	N 1.1-1.3	N 1.1-1.3
N 2.1-2.8, 5.2	N 2.1-2.8, 5.2	N 2.1-2.8, 5.2
S 1.1-1.3 2.1-2.6	S 1.1-1.3 2.1-2.6	S 1.1-1.3 2.1-2.6

2 x D – Standard length

	ϕd_1 h10	l_2	l_3	l_1	ϕd_3	ϕd_2 h6	Chamfer	Flutes	Tool no.
[inch]	1/4	1/2		2 1/4	1/4	1/4	.005	4	2571L.0250
	5/16	13/16		2 1/2	5/16	5/16	.005	5	2571L.03125
	3/8	7/8		3	3/8	3/8	.008	5	2571L.0375
	1/2	1		3 1/4	1/2	1/2	.008	5	2571L.0500
	5/8	1 1/4		3 3/4	5/8	5/8	.008	5	2571L.0625
	3/4	1 1/2		4 1/4	3/4	3/4	.012	5	2571L.0750
[mm]	6	13	20	57	5.8	6	0.12	4	2531L.006
	8	19	25	63	7.7	8	0.12	5	2531L.008
	10	22	30	72	9.5	10	0.2	5	2531L.010
	12	26	35	83	11.5	12	0.2	5	2531L.012
	16	32	40	92	15.5	16	0.2	5	2531L.016
	20	40	50	104	19.5	20	0.3	5	2531L.020

3 x D – Long length

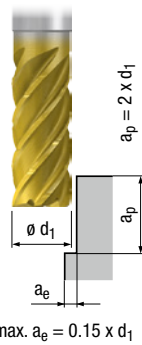
	ϕd_1 h10	l_2	l_3	l_1	ϕd_3	ϕd_2 h6	Chamfer	Flutes	Tool no.
[inch]	1/4	3/4		2 1/2	1/4	1/4	.005	4	2573L.0250
	5/16	1		2 3/4	5/16	5/16	.005	5	2573L.03125
	3/8	1 1/8		3 1/4	3/8	3/8	.008	5	2573L.0375
	1/2	1 1/2		3 3/4	1/2	1/2	.008	5	2573L.0500
	5/8	1 7/8		4 1/4	5/8	5/8	.008	5	2573L.0625
	3/4	2 1/4		5	3/4	3/4	.012	5	2573L.0750
[mm]	6	18	25	62	5.8	6	0.12	4	2533L.006
	8	24	30	68	7.7	8	0.12	5	2533L.008
	10	30	35	80	9.5	10	0.2	5	2533L.010
	12	36	45	93	11.5	12	0.2	5	2533L.012
	16	48	55	108	15.5	16	0.2	5	2533L.016
	20	60	70	126	19.5	20	0.3	5	2533L.020

4 x D – Long length

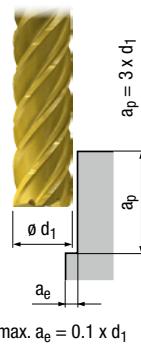
	ϕd_1 h10	l_2	l_3	l_1	ϕd_3	ϕd_2 h6	Chamfer	Flutes	Tool no.
[inch]	1/4	1		2 3/4	1/4	1/4	.005	4	2575L.0250
	5/16	1 1/4		3	5/16	5/16	.005	5	2575L.03125
	3/8	1 1/2		3 3/4	3/8	3/8	.008	5	2575L.0375
	1/2	2		4 1/4	1/2	1/2	.008	5	2575L.0500
	5/8	2 1/2		5	5/8	5/8	.008	5	2575L.0625
	3/4	3		6	3/4	3/4	.012	5	2575L.0750
[mm]	6	24	30	68	5.8	6	0.12	4	2535L.006
	8	32	40	80	7.7	8	0.12	5	2535L.008
	10	40	50	95	9.5	10	0.2	5	2535L.010
	12	48	60	107	11.5	12	0.2	5	2535L.012
	16	64	75	128	15.5	16	0.2	5	2535L.016
	20	80	90	150	19.5	20	0.3	5	2535L.020



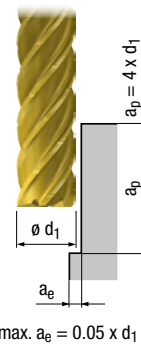
2 x D



3 x D



4 x D

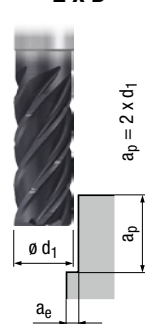


Valid for
 2577TZ 2579TZ 2581TZ
 2537TZ 2539TZ 2541TZ

		2 x D		3 x D		4 x D					
		v_c (SFM)	f_z (inch)	v_c (SFM)	f_z (inch)	v_c (SFM)	f_z (inch)				
P	1.1	1115	$0.012 \times d_1$	1050	$0.012 \times d_1$	980	$0.011 \times d_1$	□	■	□	■
	2.1	1050	$0.011 \times d_1$	980	$0.011 \times d_1$	885	$0.010 \times d_1$	□	■	□	■
	3.1	980	$0.010 \times d_1$	915	$0.010 \times d_1$	820	$0.009 \times d_1$	□	■	□	■
	4.1	885	$0.009 \times d_1$	820	$0.009 \times d_1$	755	$0.008 \times d_1$	□	■		
	5.1	820	$0.008 \times d_1$	755	$0.008 \times d_1$	655	$0.007 \times d_1$	□	■		
M	1.1	490	$0.008 \times d_1$	455	$0.008 \times d_1$	425	$0.008 \times d_1$				■
	2.1	425	$0.008 \times d_1$	390	$0.008 \times d_1$	360	$0.008 \times d_1$				■
	3.1	360	$0.007 \times d_1$	325	$0.007 \times d_1$	295	$0.007 \times d_1$				■
	4.1	325	$0.007 \times d_1$	295	$0.007 \times d_1$	260	$0.007 \times d_1$				■
K	1.1	685	$0.009 \times d_1$	655	$0.009 \times d_1$	620	$0.009 \times d_1$	□	■		□
	1.2	685	$0.009 \times d_1$	655	$0.009 \times d_1$	620	$0.009 \times d_1$	□	■		□
	2.1	655	$0.007 \times d_1$	590	$0.007 \times d_1$	555	$0.007 \times d_1$	□	■		□
	2.2	655	$0.007 \times d_1$	590	$0.007 \times d_1$	555	$0.007 \times d_1$	□	■		□
	3.1	525	$0.007 \times d_1$	490	$0.007 \times d_1$	455	$0.007 \times d_1$	□	■		□
	3.2	525	$0.007 \times d_1$	490	$0.007 \times d_1$	455	$0.007 \times d_1$	□	■		□
	4.1	455	$0.005 \times d_1$	425	$0.005 \times d_1$	390	$0.005 \times d_1$	□	■		□
	4.2	325	$0.005 \times d_1$	295	$0.005 \times d_1$	260	$0.005 \times d_1$	□	■		□
N	1.1	1145	$0.014 \times d_1$	1050	$0.014 \times d_1$	980	$0.014 \times d_1$			□	■
	1.2	1145	$0.013 \times d_1$	1050	$0.013 \times d_1$	980	$0.013 \times d_1$			□	■
	1.3	1145	$0.012 \times d_1$	1050	$0.012 \times d_1$	980	$0.012 \times d_1$			□	■
	1.4										
	1.5										
	1.6										
	2.1	655	$0.009 \times d_1$	625	$0.009 \times d_1$	590	$0.009 \times d_1$			□	■
	2.2	655	$0.009 \times d_1$	625	$0.009 \times d_1$	590	$0.009 \times d_1$			□	■
	2.3	655	$0.009 \times d_1$	625	$0.009 \times d_1$	590	$0.009 \times d_1$		□	□	■
	2.4	590	$0.007 \times d_1$	525	$0.007 \times d_1$	490	$0.007 \times d_1$			□	■
	2.5	590	$0.007 \times d_1$	525	$0.007 \times d_1$	490	$0.007 \times d_1$			□	■
	2.6	590	$0.007 \times d_1$	525	$0.007 \times d_1$	490	$0.007 \times d_1$			□	■
	2.7	325	$0.005 \times d_1$	295	$0.005 \times d_1$	260	$0.005 \times d_1$		□	□	■
	2.8	325	$0.005 \times d_1$	295	$0.005 \times d_1$	260	$0.005 \times d_1$			□	■
	3.1										
	3.2										
	4.1										
	4.2										
4.3											
4.4											
5.1											
5.2	395	$0.005 \times d_1$	360	$0.005 \times d_1$	325	$0.005 \times d_1$					■
5.3											
S	1.1	460	$0.007 \times d_1$	425	$0.007 \times d_1$	395	$0.007 \times d_1$				■
	1.2	425	$0.007 \times d_1$	395	$0.007 \times d_1$	360	$0.007 \times d_1$				■
	1.3	395	$0.006 \times d_1$	360	$0.006 \times d_1$	325	$0.006 \times d_1$				■
	2.1	325	$0.004 \times d_1$	295	$0.004 \times d_1$	260	$0.004 \times d_1$				■
	2.2	100	$0.004 \times d_1$	100	$0.004 \times d_1$	80	$0.004 \times d_1$				■
	2.3	130	$0.004 \times d_1$	130	$0.004 \times d_1$	115	$0.004 \times d_1$				■
	2.4	130	$0.004 \times d_1$	130	$0.004 \times d_1$	115	$0.004 \times d_1$				■
2.5	130	$0.004 \times d_1$	115	$0.004 \times d_1$	100	$0.004 \times d_1$				■	
2.6	100	$0.004 \times d_1$	100	$0.004 \times d_1$	80	$0.004 \times d_1$				■	
H	1.1										
	1.2										
	1.3										
	1.4										
	1.5										

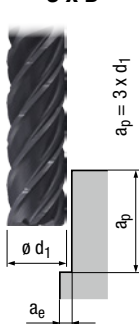


2 x D



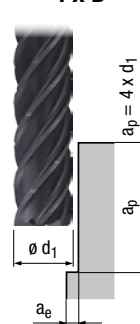
max. $a_e = 0.15 \times d_1$

3 x D



max. $a_e = 0.1 \times d_1$

4 x D



max. $a_e = 0.05 \times d_1$

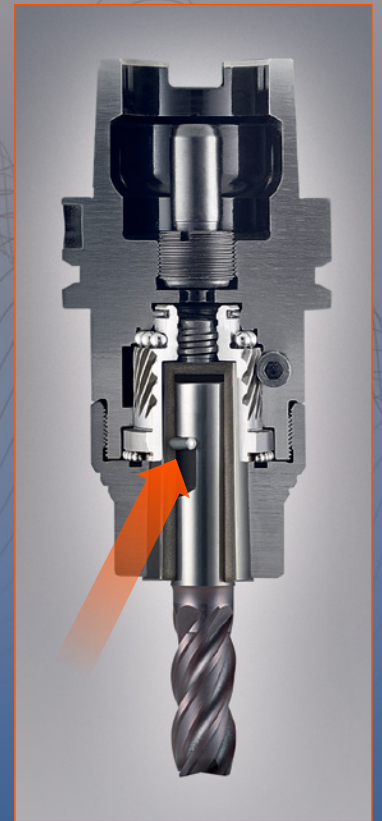
Valid for
 2571L 2573L 2575L
 2531L 2533L 2535L

		2 x D		3 x D		4 x D					
		v_c (SFM)	f_z (inch)	v_c (SFM)	f_z (inch)	v_c (SFM)	f_z (inch)				
P	1.1	1115	$0.012 \times d_1$	1050	$0.012 \times d_1$	985	$0.011 \times d_1$	□	■	□	■
	2.1	1050	$0.011 \times d_1$	985	$0.011 \times d_1$	885	$0.010 \times d_1$	□	■	□	■
	3.1	985	$0.010 \times d_1$	920	$0.010 \times d_1$	820	$0.009 \times d_1$	□	■	□	■
	4.1	885	$0.009 \times d_1$	820	$0.009 \times d_1$	755	$0.008 \times d_1$	□	■		
	5.1	820	$0.008 \times d_1$	755	$0.008 \times d_1$	655	$0.007 \times d_1$	□	■		
M	1.1	460	$0.008 \times d_1$	425	$0.008 \times d_1$	395	$0.007 \times d_1$				■
	2.1	395	$0.008 \times d_1$	360	$0.008 \times d_1$	325	$0.007 \times d_1$				■
	3.1	325	$0.007 \times d_1$	295	$0.007 \times d_1$	260	$0.006 \times d_1$				■
	4.1	295	$0.007 \times d_1$	260	$0.007 \times d_1$	230	$0.006 \times d_1$				■
K	1.1	820	$0.009 \times d_1$	755	$0.009 \times d_1$	690	$0.009 \times d_1$	□	■	□	
	1.2	820	$0.009 \times d_1$	755	$0.009 \times d_1$	690	$0.009 \times d_1$	□	■	□	
	2.1	755	$0.007 \times d_1$	690	$0.007 \times d_1$	655	$0.007 \times d_1$	□	■	□	
	2.2	755	$0.007 \times d_1$	690	$0.007 \times d_1$	655	$0.007 \times d_1$	□	■	□	
	3.1	655	$0.007 \times d_1$	590	$0.007 \times d_1$	525	$0.007 \times d_1$	□	■	□	
	3.2	655	$0.007 \times d_1$	590	$0.007 \times d_1$	525	$0.007 \times d_1$	□	■	□	
	4.1	560	$0.005 \times d_1$	525	$0.005 \times d_1$	460	$0.005 \times d_1$	□	■	□	
	4.2	460	$0.005 \times d_1$	395	$0.005 \times d_1$	325	$0.005 \times d_1$	□	■	□	
N	1.1	1050	$0.014 \times d_1$	985	$0.014 \times d_1$	885	$0.014 \times d_1$			□	■
	1.2	1050	$0.013 \times d_1$	985	$0.013 \times d_1$	885	$0.013 \times d_1$			□	■
	1.3	1050	$0.012 \times d_1$	985	$0.012 \times d_1$	885	$0.012 \times d_1$			□	■
	1.4										
	1.5										
	1.6										
	2.1	655	$0.009 \times d_1$	625	$0.009 \times d_1$	590	$0.009 \times d_1$			□	■
	2.2	655	$0.009 \times d_1$	625	$0.009 \times d_1$	590	$0.009 \times d_1$			□	■
	2.3	655	$0.009 \times d_1$	625	$0.009 \times d_1$	590	$0.009 \times d_1$		■	□	■
	2.4	590	$0.007 \times d_1$	525	$0.007 \times d_1$	490	$0.007 \times d_1$			□	■
	2.5	590	$0.007 \times d_1$	525	$0.007 \times d_1$	490	$0.007 \times d_1$			□	■
	2.6	590	$0.007 \times d_1$	525	$0.007 \times d_1$	490	$0.007 \times d_1$		■	□	■
	2.7	490	$0.005 \times d_1$	460	$0.005 \times d_1$	425	$0.005 \times d_1$			□	■
	2.8	425	$0.005 \times d_1$	395	$0.005 \times d_1$	395	$0.005 \times d_1$			□	■
	3.1										
	3.2										
4.1											
4.2											
4.3											
4.4											
5.1											
5.2	330	$0.005 \times d_1$	295	$0.005 \times d_1$	260	$0.005 \times d_1$			□	■	
5.3											
S	1.1	395	$0.007 \times d_1$	325	$0.007 \times d_1$	295	$0.007 \times d_1$				■
	1.2	325	$0.007 \times d_1$	295	$0.007 \times d_1$	260	$0.007 \times d_1$				■
	1.3	295	$0.006 \times d_1$	260	$0.006 \times d_1$	230	$0.006 \times d_1$				■
	2.1	325	$0.004 \times d_1$	295	$0.004 \times d_1$	260	$0.004 \times d_1$				■
	2.2	100	$0.004 \times d_1$	100	$0.004 \times d_1$	80	$0.004 \times d_1$				■
	2.3	130	$0.004 \times d_1$	130	$0.004 \times d_1$	115	$0.004 \times d_1$				■
	2.4	130	$0.004 \times d_1$	130	$0.004 \times d_1$	115	$0.004 \times d_1$				■
2.5	130	$0.004 \times d_1$	115	$0.004 \times d_1$	100	$0.004 \times d_1$				■	
2.6	100	$0.004 \times d_1$	100	$0.004 \times d_1$	80	$0.004 \times d_1$				■	
H	1.1										
	1.2										
	1.3										
	1.4										
	1.5										

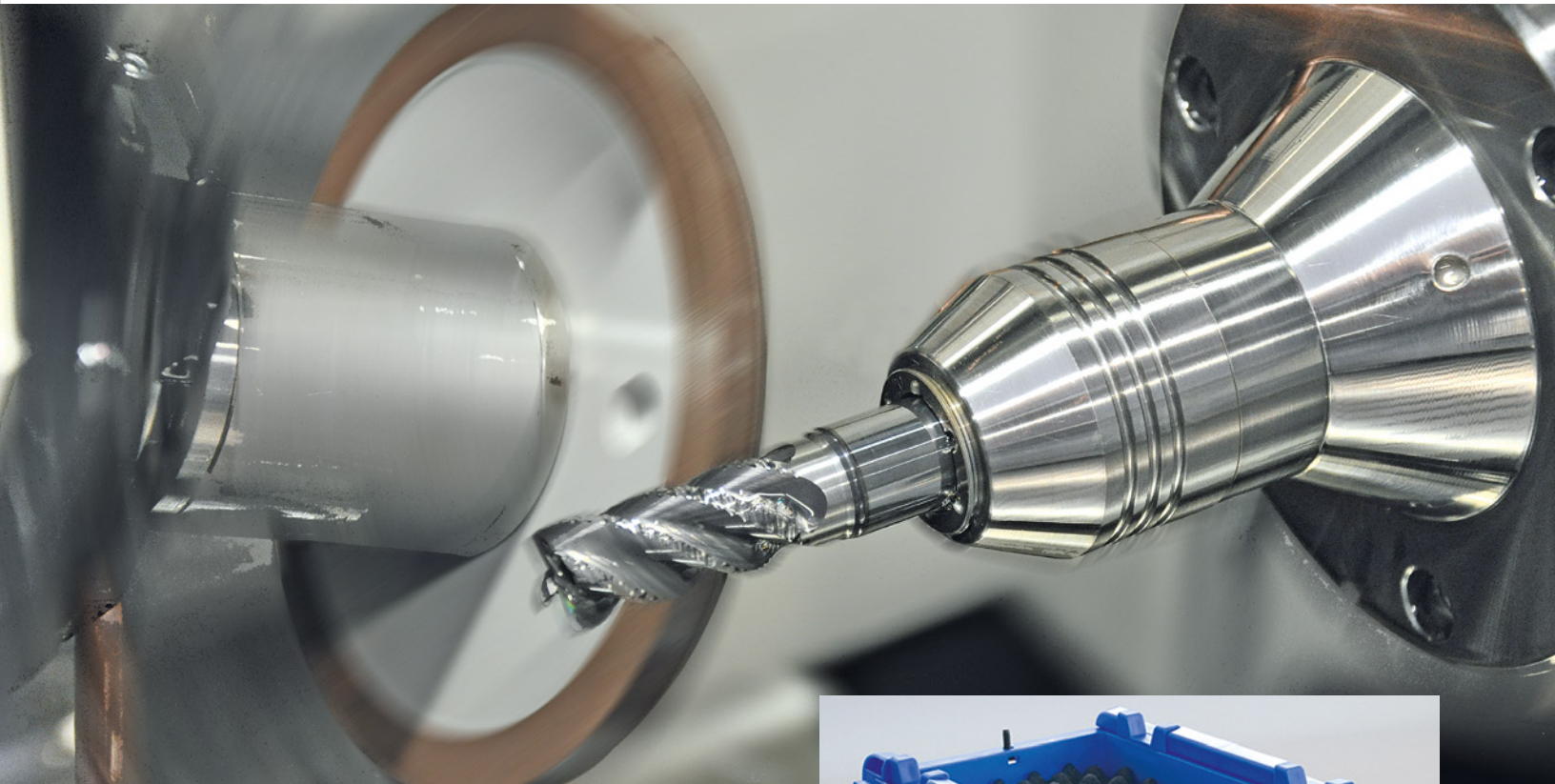
■ = very suitable v_c = Cutting speed
 □ = suitable f_z = Feed per tooth

Emuge High Precision / Performance FPC Milling / Drilling Chucks

Emuge FPC Chucks provide unprecedented rigidity, vibration dampening, concentricity, machining speed and tool life vs. conventional chuck technologies for milling and drilling applications. Available in a wide range of styles, internal and peripheral coolant collet options, and MQL-adaptable.



Strong clamping force via internal worm gear design, along with optional Pin-Lock System, provides guaranteed holding power and pull-out protection.



Emuge offers tool grinding/reconditioning for all end mill products. Reconditioning services in the USA are performed at our West Boylston, MA USA facility.

Reconditioning your Emuge tools through Emuge makes sense. Emuge has the knowledge and manufacturing expertise to refurbish an Emuge tool to its original condition and specification, providing maximum performance levels, predictable operation and longer life than any other method, all at a modest investment for the utmost value.

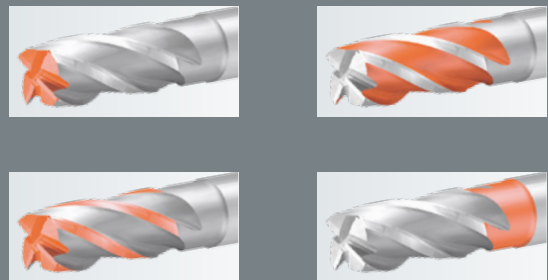
Emuge reconditioning offers:

- Complete inspection and quotation.
- Complete regrinding to the original geometry of the tool.
- Coating via state-of-the-art coating system.
- Corner radius, Weldon flats and other modifications to standard end mills.
- Prompt delivery of reground tools.



Rugged protective containers for shipping tools and individual or bulk packaging provided as needed.

Reconditioning examples – End Mills



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